

Alaska Department of Fish and Game  
Division of Game  
Federal Aid in Wildlife Restoration  
Annual Report of Survey—Inventory Activities

# MOUNTAIN GOAT



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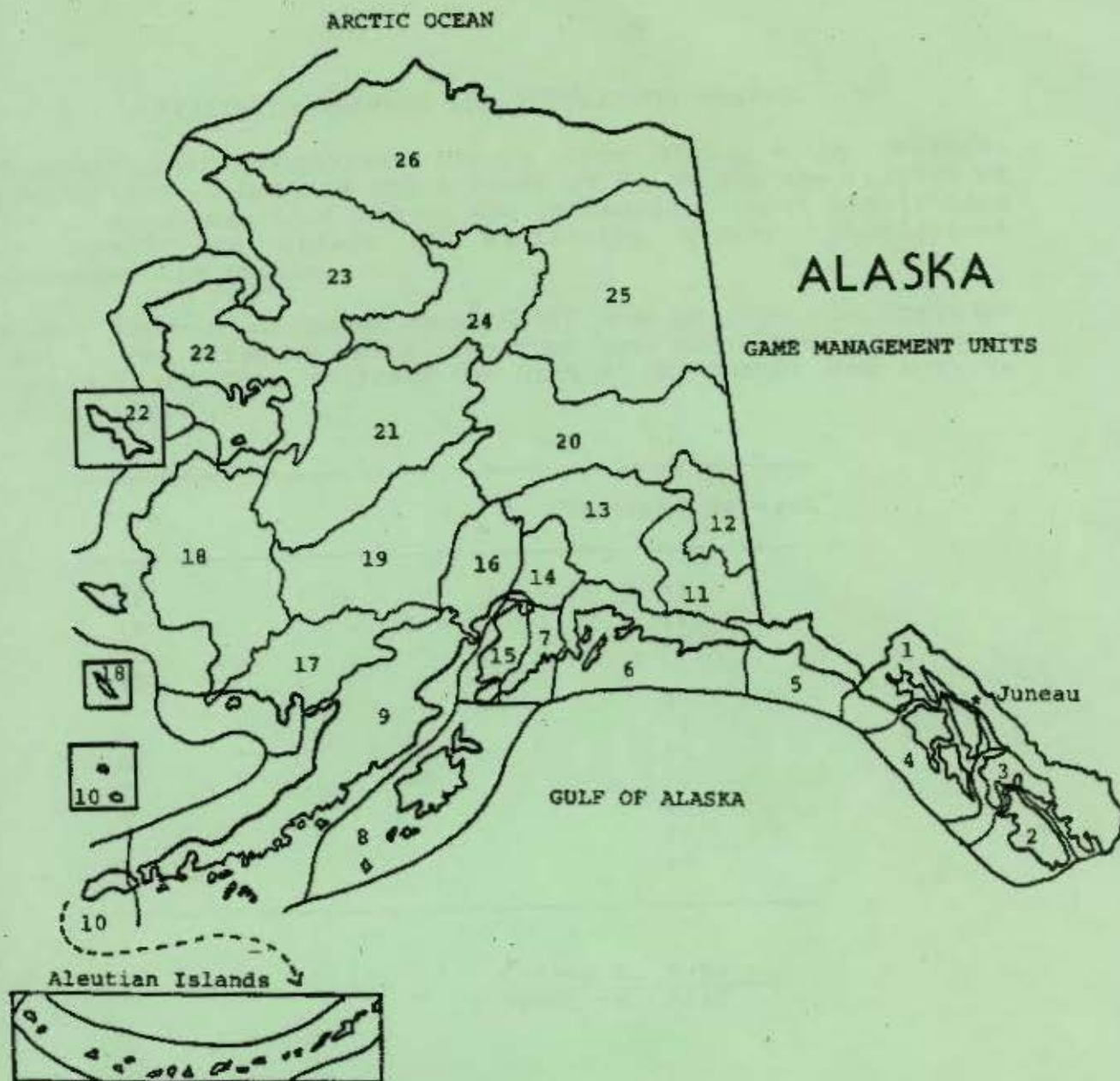
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## STATEWIDE HARVEST AND POPULATION STATUS

Mountain goat population trends were variable in 1986-87; populations in Units 4 and 8 (both of which are the results of transplants) and in 7 and 15 are increasing. Goat populations in Unit 1 are stable or decreasing slowly; populations elsewhere are stable.

Hunter harvest of goats in 1986-87 was up from the previous year. The highest take occurred on the Kenai Peninsula (Units 7 and 15), followed by Unit 6 (95 goats) and Unit 1A (51 goats).

Unit	Reported harvest
1A	51
1B	41
1C	43
1D	25
4	50
5	9
6	120
7 & 15	118
8	40
11	30
13-14	49

Steven R. Peterson  
Research Chief

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 1A

GEOGRAPHIC DESCRIPTION: Ketchikan area

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The winter of 1985-86 brought fairly heavy snowfall, particularly at higher elevations. The fall 1986 surveys indicated that some losses in both kids and adults may have occurred. The winter of 1986-87 was considerably milder; fall 1987 counts should be higher.

Population Composition

Only 4 survey areas were completed in September 1986 (Table 1); 423 goats were observed during 4.0 survey hours (104 goats/hour). The ratio of kids to adults was 18:100. The number of goats/hour and kids:100 adults ratio were lower than those of 1985. Ground surveys were conducted during April 1987; aerial surveys, during May (Table 2).

Mortality

The winter of 1986-87 appeared to be quite mild; however, overwinter losses will not be assessed until the fall surveys have been completed. The limited spring surveys conducted in 1987 indicated little, if any, kid mortality during the winter.

Goat hunting in Southeast has been managed by registration permit for 7 years; for the past 5 years, 2nd permits for portions of Units 1A and 1B have been available to those successful hunters who return reports of their 1st-permit hunt. Two hundred and thirty-four 1st permits and nine 2nd permits were issued from the Ketchikan office for the 1986 season, a slight decrease from last year. For this report, 2nd-permit holders were considered separate hunters. Within Subunit 1A, 123 hunters killed 51 goats (16 males, 33 females, and 2 unknown) in 375 hunter days (Table 3). The success rate was 41%; 7.3 hunter days were expended per goat harvested.

Non-resident hunters accounted for 25% of the harvest. Hunter numbers declined slightly from 1985, but the number of goats harvested was essentially the same as last year. Two of the 243 hunt reports issued from the Ketchikan office were never received. Considerable effort was expended contacting late-reporting hunters; no citations were issued.

Chronology of the harvest was similar to past years. This year 8% of the goats were taken in August, 59% in September, 8% in October, 2% in November, and 15% in December. The highest harvest consistently occurs in September, while the lowest occurs in November.

Airplanes were again the primary means of transportation used to reach the hunting areas: 82% of the successful hunters and 74% of the unsuccessful hunters used air transport. Boats were used by those hunters not using planes. Boat transportation was primarily used later in the season when the high-elevation lakes had begun to freeze. Late-season hunts from boats were not very successful.

The area with the largest harvest was again Rudyerd and Smeaton Bays, which accounted for 35% of the goats reported from Subunit 1A. The Chickamin River-Rudyerd Bay area yielded 24% of the harvest, 12% came from the Yes Bay-Eagle River area, and 20% came from the Boca de Quadra-Portland Canal area. One goat was taken on the lower Cleveland Peninsula portion of Subunit 1A.

#### Management Summary and Recommendations

Currently goat populations in Subunit 1A appear to be moderately high. The harvest remains low and fairly well distributed over a wide portion of the subunit. The winter of 1986-87 did not appear to have a substantial impact on the goat population.

The mountain goat transplant to Revillagigedo Island, which was conducted in June and July 1983, appears to be successful. Radio collars placed on 15 of the goats are no longer functioning. Only 1 known mortality was recorded while the radios were functioning. Incidental observations have shown goats to be present over most of the original release site, and uncolored adults with kids have been sighted.

No changes in season or bag limit are recommended at this time.

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Rod Flynn  
Survey-Inventory Coordinator

Table 1. Mountain goat composition surveys in Subunit 1A, September 1986.

Area	Date	No. adults	No. kids	Total goats	Hours of survey time	No. goats observed/hr	Kids:100 adults	Survey rating
K-3	(no survey)							
K-4	(no survey)							
K-5	15 Sept 86	148	24	172	1.20	143	16	good
K-6	(no survey)							
K-7	(no survey)							
K-8	(no survey)							
K-9	12 Sept 86	106	21	127	1.38	92	20	good
K-10	14 Sept 86	75	12	87	1.13	77	16	good
K-11	14 Sept 86	30	7	37	0.33	111	23	good
Totals		359	64	426	4.05			
Means						104	18	



Table 2. Mountain goat spring-composition surveys in Subunit 1A, 1982-87.

Area	Date	No. adults	No. kids	Total goats	Hours of survey time	No. goats observed/hr	Kids:100 adults	Survey rating
Walker/Rudyerd	13 May 82	69	15	84	1.08	78	22	good
Rudyerd	22 Apr 83	47	13	60	1.10	55	28	good
Walker	22 Apr 83	92	20	112	0.73	153	22	good
Chickamin	12 May 83	44	9	55	0.97	57	20	good
Walker	19 Apr 84	77	16	94	0.80	118	21	good
Walker	15 May 85	46	10	56	0.75	75	22	fair
Walker	25 Apr 86	52	9	61	0.78	71	17	good
Rudyerd	25 Apr 86	15	3	18	0.37	49	20	good
Walker	20 May 87	45	5	50	0.50	100	11	good
Rudyerd	20 May 87	11	2	13	0.43	30	18	good

Table 3. Goat harvest and hunter success in Subunit 1A, 1972-86.

Season	No animals				Percent harvest by non resident	No. successful hunters	No. hunters	Percent Hunters hunter taking success 2 goats	
	M	F	Unk	Totals					
1972	23	23	2	48	0	42	117	36	6
1973	36	20	4	60	22	50	133	38	10
1974	26	19	2	47	13	37	109	34	10
1975	8	9	0	17	24	17	93	18	- <sup>a</sup>
1976	10	5	0	15	0	15	55	27	--
1977	19	16	2	37	14	37	80	46	--
1978	10	13	0	23	0	23	55	42	--
1979 <sup>b</sup>	19	10	0	29	ND	29	39	74	--
1980 <sup>b</sup>	23	37	0	60	7	60	131	46	--
1981	36	34	0	70	27	70	158	44	--
1982 <sup>c</sup>	41	39	0	80	23	80	162	49	1 <sup>c</sup>
1983 <sup>c</sup>	36	31	0	67 <sup>d</sup>	25	67	148	45	0
1984	34	19	0	53 <sup>d</sup>	38	53	142	37	2 <sup>c</sup>
1985	30	210	0	51 <sup>d</sup>	41	51	141	36	2 <sup>c</sup>
1986	16	33	2	51 <sup>d</sup>	25	51	123	41	2 <sup>c</sup>

<sup>a</sup> Bag limit reduced from 2 to 1 in 1975

<sup>b</sup> Mandatory reporting required for registration-permit system began in 1980.

<sup>c</sup> Second permit issued to reporting, successful hunters; 2nd permits treated as separate hunters.

<sup>d</sup> Lower harvest in 1984, 1985, and 1986 vs. 1983 is primarily due to a change in assigning harvest locations; harvest previously counted as Subunit 1A harvest is now assigned to Subunit 1B.

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1B

GEOGRAPHICAL DESCRIPTION: Southeast Mainland from Cape  
Fanshaw to Lemesurier Point

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27

Population Status and Trend

Limited aerial surveys indicate that goat populations in Subunit 1B remain stable. Because flying conditions are usually poor during surveys, year-to-year variations in aerial counts are large. Also, local population sizes may show great yearly variation because of variable hunting pressure and movement among adjacent drainages.

Population Composition

Population surveys were conducted during June using fixed-wing aircraft. Surveys were usually begun just after sunrise on clear or high-overcast days. Clear weather seems to reduce the numbers of goats observed; they are probably seeking shade. In 1986 we observed 100 goats during 3 separate flights (3.4 hours of survey time). Of the 100 goats observed during the surveys, 22 were kids (28 kids:100 adults), representing an increase from 6 kids:100 adults observed in 1985 (Table 1); however, improved observation conditions, a milder winter, and an earlier snow melt probably accounted for some of that increase. The 1986 ratio of kids:100 adults was similar to the 30 kids:100 adults counted in 1984 and the 22 kids:100 adults observed in 1983.

Mortality

In 1986, 195 hunters registered to hunt mountain goats in Subunit 1B; all permits were returned. Forty-one goats were killed by the 109 permittees that hunted. The success rate for hunters (38%) was slightly higher, compared with that (29%) in 1985. The percentage of females in the harvest increased slightly from 58% (19) in 1985 to 59% (24) in 1986. From 1975 to 1986, the harvest has varied from 15 to 42 goats

(Table 2) and averaged 30 goats. Although the 12-year average shows an equal number of male and female goats in the harvest, the percentage of females killed has increased slightly during the past 5 years.

Several factors influence the timing of the goat harvest in Subunit 1B. Storm systems after September intermittently prevent air or boat travel to the goat ranges. The hunting season is long so that hunters are able to take advantage of brief periods of calm, clear weather that are dispersed throughout the 5-month season. Alpine lakes are used as float plane landing sites until they freeze in the late fall. In November and December, when goats begin to use spruce-hemlock forests at lower elevations, hunters usually travel by boat to the goat ranges.

Fifty-four percent (22) of the goat harvest occurred during September, 32% (13) in August, 7% (3) in October, 5% (2) in November, and 2% (1) in December (Table 3). Sixty-three percent (26) of the successful hunters traveled by aircraft; the remainder used boats.

Hunters reported spending 294 days afield in Subunit 1B. The Horn Cliffs area, which is easily accessible by skiff from Petersburg, was the most popular hunting area, receiving 33% (98 hunter-days) of the Subunit's hunting effort; 15% (6) of the harvest was taken there. The Tyee Lake area also accounts for 15% of the harvest (6). The Boulder Lake area (Cleveland Peninsula) had the largest harvest (10); it is a favorite site for hunters whose trips originate in Ketchikan. Successful hunters averaged 3 days of hunting effort for each goat taken. Eighteen nonresident hunters (17%) hunted during 1986, harvesting 22% (9) of the goats.

Current regulations allow successful hunters to obtain a 2nd permit; in 1986, 6 hunters received one, but only 1 hunter killed a second goat. The 2nd permit allows additional hunting opportunity but does not appreciably increase the harvest, accounting for only 2% of the total harvest this year.

#### Management Summary and Recommendations

The sex ratio of the harvest continues to be skewed slightly; 59% of the goats harvested were females. Because females are more often found in groups, hunters find them easier to locate than the usually solitary males. The percentage of females in the harvest was 50% or greater in only five of the 14 areas where goats were harvested. Four of the 6 goats harvested in the Horn Cliffs area were females; a similar ratio was observed in the Eagle Lake area (2 of 3). Harvests in the

Boulder and Tyee Lake areas were 50% females. The entire harvest (4) in an area north of the Stikine River was female.

For the upcoming 1987 hunting season, the bag limit in the area between the Muddy River and LeConte Bay will be 1 male goat. The bag-limit restriction was developed and implemented by the Board of Game to determine the practicality of limiting the harvest to billies.

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Table 1. Age composition of mountain goats in Subunit 1B, 1985-86.

Survey date	Area		No. adults	No. kids	Total goats	Kid:100 adults	% kids
	No.	Name					
27 Aug 85	05	Scenery Crk	23	5	28	22	18
27 Aug 85	06	Swan Lake	6	0	6	0	0
27 Aug 85	07	Patterson Peaks	8	0	8	0	0
27 Aug 85	08	S. Patterson/Muddy	16	0	16	0	0
27 Aug 85	10	Horn Cliffs	16	0	16	0	0
Totals			69	5	74	7	9
16 July 86	04	Deboer	4	0	4	0	0
16 July 86	05	Scenery Creek	8	3	11	38	27
16 July 86	06	Swan Lake	6	0	6	0	0
16 July 86	07	Patterson Peaks	7	0	7	0	0
16 July 86	08	S. Patterson/Muddy	20	5	25	25	20
16 July 86	10	Horn Cliffs	7	0	7	0	0
16 July 86	11A	Thunder Mountain S.	0	0	0	0	0
20 June 86	11	Thunder Mountain	9	8	17	89	47
20 June 86	12	Wilkes	0	0	0	0	0
20 June 86	13	LeConte/Kakwan	5	4	9	80	44
20 June 86	14	Shakes/Boundry	2	0	2	0	0
12 Sept 86	10	Horn Cliffs	10	2	12	20	17
Totals			78	22	100	28	22



Table 2. Mountain goat harvest for Subunit 1B, 1973-86.

Year	No. hunters	2nd goat	Harvest			Total
			Male	Female	Unk	
1986	109	1	17	24	0	41
1985	112	2	14	19	0	33
1984	104	0	10	32	0	42
1983	103	- <sup>a</sup>	13	15	0	28
1982	88	- <sup>a</sup>	12	7	2	21
1981	93	- <sup>a</sup>	18	16	3	37
1980	86	- <sup>a</sup>	20	10	0	30
1979	--	- <sup>a</sup>	20	12	0	32
1978	41	- <sup>a</sup>	9	9	0	18
1977	72	- <sup>a</sup>	18	19	0	37
1976	54	- <sup>a</sup>	13	10	0	23
1975	49	1	10	5	0	15
1974	56	3	10	10	0	20
1973	70	4	20	12	0	32

<sup>a</sup> One goat bag limit, 1976-83.

Table 3. Chronology of mountain goat harvest in Subunit 1B, 1986.

Period	Harvest		Sex		Percent by month
	<u>n</u>	%	Males	Females	
1-15 August	5	12	2	3	
16-31 August	8	20	5	3	32
1-15 September	11	27	5	6	
16-30 September	11	27	2	9	54
1-15 October	2	5	1	1	
16-30 October	1	2	1	0	7
1-15 November	0	0	0	0	
16-30 November	2	5	1	1	5
1-15 December	0	0	0	0	
16-31 December	1	2	0	1	2
Totals	41	100	17	24	100

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1C

GEOGRAPHICAL DESCRIPTION: Southeast mainland from Cape  
Fanshaw to the latitude of Eldred  
Rock

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

Based on harvest and survey information, most populations appear stable.

Population Composition

Aerial surveys were conducted along the southern rim of Tracy Arm, the northern rim of Endicott Arm, the Lions Head area, and the area between the Lace River and Eagle River. In 5.9 hours of flying, 247 goats were observed, including 55 kids. The kid:adult ratio was 22 kids:100 adults.

Mortality

Goat hunting in Subunit 1C has been conducted under 2 registration-permit hunts since 1980 (Tables 1 and 2). During 1986, 6 goats (5 males, 1 female) were killed in Hunt Area 802. Eighteen hunters spent 44 days afield, an average of 2.4 days per hunter (range = 5 days). All hunters were Alaska residents, including 16 residing in Subunit 1C.

The 1986 goat harvest in Hunt Area No. 803 was 37 goats (28 males, 9 females). Hunters spent 175 days afield, averaging 2.6 days per hunter. Success rate was 56%. Of the 37 animals taken, 19 were killed in the Tracy and Endicott Arm areas; 36 goats were taken by Alaska residents, including 4 who were not residents of Subunit 1C. One goat was taken by a nonresident.

In Subunit 1C as a whole, goat hunters spent 219 days afield and killed 43 animals (33 males, 10 females). Hunters spent 5.1 days afield for each goat killed; the success rate was 51%.

### Management Summary and Recommendations

No significant changes were noted in mountain goat populations in Subunit 1C over 1985. In 1987 aerial surveys are planned for the area closed to hunting along the Juneau road system so that the goat population's response to a 4-year ban on hunting can be assessed. During their spring 1987 meeting, the Board of Game approved a regulation to close the area south of the Endicott River in the Chilkat Range to mountain goat hunting beginning in the fall of 1987. This area was closed by emergency order during the 1985-86 hunting season to prevent overharvesting. Available information indicates that goat numbers in this area declined by at least 50% between 1972 and 1984. Environmental stress, predation, and hunting mortality probably have kept the population from recovering from severe winters during late 1960's and early 1970's. Although the area has not received much hunting pressure recently, overharvest may occur in the more easily accessible areas.

All populations in Subunit 1C should be closely monitored to prevent overharvesting, particularly in areas with moderate-to-good access.

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Table 1. Mountain goat registration permit hunt data for Subunit 1C, southeastern Alaska, 1986.

Hunt no.	Year	No. permits issued	No. hunters	No. days hunted	Chronology of harvest					Harvest				Hunter success	Goat/hunter day
					Aug	Sep	Oct	Nov	Total	M	F	Unk	Total		
802	1980	117	34 <sup>a</sup>	67	--	- <sup>b</sup>	6	2	8	2	4	2	8	23.5	0.12
	1981	111	44 <sup>a</sup>	87	--	--	6	3	9	3	6	0	9	20.5	0.10
	1982	101	53 <sup>a</sup>	124	--	--	5	6	11	4	6	1	11	20.8	0.09
	1983 <sup>c</sup>	29	8	13	--	--	1	0	1	0	1	0	1	12.5	0.08
	1984	33	21	52	--	--	4	0	4	2	2	0	4	19.0	0.08
	1985	46	16	45	--	--	0	0	0	0	0	0	0	0.0	0.00
	1986	55	18	44	--	--	6	0	6	5	1	0	6	33.3	0.14
803	1980	140	47	166	6	7	7	8	28	9	8	11	28	59.6	0.17
	1981	129	46	129	1	2	6	13	22	8	14	0	22	47.8	0.17
	1982	140	67	189	6	0	5	21	32	16	16	0	32	47.8	0.17
	1983	203	94	322	5	9	13	14	41	23	17	1	41	43.6	0.13
	1984	169	62	183	4	9	2	10	25	13	12	0	25	40.3	0.14
	1985	156	68 <sup>a</sup>	148	4	5	4	22	35	19	16	0	35	51.5	0.24
	1986	163	66	175	6	11	8	18	37	28	9	0	37	56.0	0.21

<sup>a</sup> Includes 2 hunters who had permits for Hunt No. 803 but hunted in Hunt No. 802.

<sup>b</sup> No season.

<sup>c</sup> The area between Eagle River and Taku Glacier (about two-thirds of the hunt area) closed 1983-86.

Table 2. Harvest statistics<sup>a</sup> for mountain goats in Subunit 1C, 1972-86.

Year	Chronology of harvest								Sex composition				No. of hunters	Hunter success	Goats/hunter day
	Aug	Sep	Oct	Nov	Dec	Jan	Unk	Total	M	F	Unk	% M			
1972 <sup>b</sup>	18	10	7	8	4	17 <sup>d</sup>	6	70	36	34	0	51	149	40.3 <sup>c</sup>	--
1973	30	32	11	21	17	--	1	112	56	56	0	50	177	52.5 <sup>e</sup>	--
1974	19	18	7	15	30	--	5	94	40	51	3	44	159	44.0 <sup>f</sup>	--
1975	7	8	20	15	13	--	5	68	42	25	1	63	138	49.3	--
1976	2	0	12	5	16	--	6	41	13	28	0	32	107	38.3	--
1977	8	8	0	8 <sup>g</sup>	3 <sup>g</sup>	--	3	30	19	9	2	68	72	41.6	--
1978	3	3	6	17	--	--	6	35	24	11	0	69	80	43.8	--
1979	7	3	13	15	--	--	0	38	21	17	0	55	65	58.5	--
1980	6	6	13	10	--	--	0	36	12	12	12	50	81	44.4	0.16
1981	1	2	12	16	--	--	0	31	11	20	0	36	90	34.4	0.14
1982	6	0	10	27	--	--	0	43	20	22	1	48	120	35.8	0.14
1983	5	9	14	14	--	--	0	42	23	18	1	56	102	41.2	0.13
1984	4	9	6	10	--	--	0	29	15	14	0	52	83	34.9	0.12
1985	4	5	4	22	--	--	0	35	19	16	0	54	84	41.7	0.18
1986	6	11	2	18	--	--	0	43	33	10	0	77	84	51.1	0.20

<sup>a</sup> Information from harvest ticket reports 1972-79 and registration permits 1980-86.

<sup>b</sup> Bag limit for seasons 1972-74 was 2 goats; 1975-86 was 1 goat.

<sup>c</sup> Based on 60 successful hunters, 10 of whom took 2 goats each.

<sup>d</sup> Season closed.

<sup>e</sup> Based on 93 successful hunters, 19 of whom took 2 goats each.

<sup>f</sup> Based on 70 successful hunters, 24 of whom took 2 goats each.

<sup>g</sup> Revised in 1979 from figures reported in Table 2 of the 1978 Survey-Inventory for Subunit 1C.



MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1D

GEOGRAPHICAL DESCRIPTION: Upper Lynn Canal

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27

Population Status and Trend

Based on harvest trends and hunter success rates, the mountain goat population is believed to be stable.

Population Composition

Population composition surveys were conducted on 26 September from Dayehas Creek to White Pass and from West Creek to Halutu Ridge. Survey conditions were poor because of patchy snow conditions. In the first area, 6 kids and 31 adults were counted in 1.4 hours (19 kids:100 adults, 26 goats/hour). In the second area, the survey was aborted after only 4 goats were observed in 0.5 hour.

Mortality

In 1986, 143 registration permits were issued to goat hunters in Subunit 1D. Sixty permittees did not hunt, and 5 reports remain outstanding. Fifty-three permittees hunted unsuccessfully for an average of 2.0 days each.

Twenty-three residents and 2 nonresidents harvested 9 males and 13 females as well as 3 goats of unspecified sex. Successful hunters averaged 1.9 days afield. Most hunters (15) used highway vehicles; 9 hunters used boats, and one used aircraft for access. Goats were taken in September (9), October (13), November (2), and December (1). Seven goats were taken from the lower Chilkat watershed and drainages south of the Chilkat River; 6 goats were taken from the area between Chilkoot and Taiya Rivers; 6 were taken east of Skagway; 4 were taken from the upper Chilkat; 1 was taken from lower eastern Lynn Canal; and 1 was taken from an unknown location in the subunit.

### Management Summary and Recommendations

The number of goat hunters in Subunit 1D has decreased during the past 2 years, and the success rate has declined since 1982. However, the current year's success rate is similar to the 1975-1986 mean. Attention should be paid to the male:female ratio of the harvest, which has been skewed towards females in 2 of the last 3 years. The sex ratio of the harvest for the 1975-1986 period is about 120 males:100 females.

Extensive age composition surveys of Subunit 1D should be conducted in 1987. Hunt Area No. 804, between Taiya River and the rail line, is of special concern because it has been closed to hunting since 1985.

No changes in season or bag limit are recommended.

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Table 1. Historical mountain goat harvest in Subunit 1D, 1975-86.

Year	No. males	No. females	No. Unk.	Totals	No. hunters	Success rate(%)
1975	21	12	1	34	77	52
1976	8	9	0	17	65	45
1977	15	9	1	25	69	26
1978	7	10	0	17	52	36
1979	14	8	0	22	40	55
1980	11	10	9	30	103	29
1981	24	19	0	43	127	34
1982	13	11	1	25	103	24
1983	20	14	0	34	130	26
1984	12	18	0	30	115	26
1985 <sup>a</sup>	10	5	0	15	88	17
1986	9	13	3	25	78	32
Totals	164	138	15	317	1,047	
Means	13.7	11.5	1.3	26.4	87.3	33.5

<sup>a</sup> Numbers of hunters for years prior to 1985 were computed from permit reports for 3 different hunts (804, 805, and 806); therefore, individuals were counted once for each hunt area in which they hunted. Since 1985, individuals have been counted once if they hunted in one or more hunt areas.

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 4

GEOGRAPHICAL DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent Islands

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27

Mortality

The sport kill of mountain goats from Baranof Island (Registration Permit Hunt No. 815) in 1986 was 50 animals (28 males, 22 females; Table 1). The goats were harvested by the 128 permittees who actually hunted. The average hunter expended 2.4 days effort in pursuit of goats. An additional 139 persons obtained permits but did not hunt. Three permits were not returned.

Of the permit holders, 83% were residents of Sitka; 7%, residents of Southeast Alaska (excluding Sitka); 7%, other Alaskans; and 3%, nonresidents. Sitka hunters took 76% of the harvest; other Southeast residents took 6%, other Alaskans, 6%; and nonresidents, 12%.

Transport means among successful hunters were boats (58%), walking from the road system (14%), airplanes (25%), and other means (3%).

Management Summary and Recommendations

The current regulations appear appropriate for the proper management of the Baranof Island goat population. A thorough aerial (helicopter) survey every 3 years provides adequate population information for this herd; the next survey is scheduled for 1988. Because kid numbers seem to be reduced after severe winters (Table 2; e.g., 1970, 1982, and 1985), it would be appropriate to conduct an aerial survey following the next severe winter.

No changes in season or bag limit are recommended.

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SUBMITTED BY:

Rod Flynn  
Survey-Inventory Coordinator

Table 1. Mountain goat harvest data for Unit 4, 1970-86.<sup>a</sup>

Regulatory year	No. males	No. females	No. unk.	Total harvest	No. hunters	Percent success
1970-71 <sup>b</sup>	--	00	16	16	48	33.3
1971-72 <sup>b</sup>	--	--	20	20	75	26.6
1972-73	5	5	0	10	50	20.0
1973-74	11	13	0	24	45	53.3
1974-75	7	3	0	10	39	26.5
1975-76	18	10	0	28	65	43.0
1976-77	18	10	0	28	100	28.0
1977-78	22	18	0	40	97	41.2
1978-79	17	14	1	32	85	37.6
1979-80	30	27	2	59	151	39.0
1980-81	25	23	1	42	147	33.3
1981-82	30	44	0	74	211	35.0
1982-83	42	33	0	75	221	33.9
1983-84	33	28	0	61	212	28.8
1984-85	34	15	0	49	143	34.3
1985-86 <sup>c</sup>	18	18	6	42	138	30.4
1986-87	28	22	0	50	128	39.1

<sup>a</sup> Data source: 1970-72, 10% hunter interview; 1972-75, harvest ticket reports; 1976-85, registration permit hunt reports.

<sup>b</sup> Sex not available.

<sup>c</sup> Includes 6 goats that were reported killed but not retrieved.

Table 2. Mountain goat surveys in Unit 4, 1923-1985.

Date	Survey data					Observer	Aircraft type
	No. kids	No. adults	Total goats	Kids:100 adults	Goats/ hr.		
1923	-- <sup>a</sup>	--	18 <sup>b</sup>	--	--	--	--
1937	--	--	41	--	--	Alaska Game Commission	--
1954	41	222	263	18.5	--	USF&WS	--
Sep. 1960	26	90	116	28.9	38.4	Merriam - ADF&G	--
Sep. 1961	20	98	118	20.4	--	Merriam - ADF&G	--
Sep. 1970 <sup>c</sup>	15	139	154	10.8	--	Courtright - ADF&G	Helio Courier
Sep. 1970	13	108	121	12.0	--	Courtright - ADF&G	Helio Courier
Sep. 1973	50	203	253	24.6	36.1	Johnson - ADF&G	Piper PA-18
Aug. 1976 <sup>d</sup>	47	195	242	24.1	62.0	Johnson - ADF&G	Piper PA-18
Aug. 1977	148	393	541	37.7	73.1	Johnson - ADF&G	Hughes 500 Helicopter
Aug. 1979 <sup>e</sup>	76	321	397	23.7	79.4	Johnson - ADF&G	Hughes 500 Helicopter
Aug. 1980 <sup>f</sup>	106	367	473	28.9	70.9	Johnson - ADF&G	Alouette II - Helicopter
Sep. 1982 <sup>d</sup>	84	422	506	19.7	76.9	Johnson - ADF&G	Alouette II - Helicopter
Sep. 1985 <sup>f</sup>	76	458	534	16.6	68.9	Johnson - ADF&G	Jet Ranger Helicopter

<sup>a</sup> Data not available.

<sup>b</sup> Original transplant of 18 goats from Tracy Arm, Subunit 1C.

<sup>c</sup> Incomplete coverage.

<sup>d</sup> North of Vodopad River only.

<sup>e</sup> North of Medvejie Lake - Baranof River only.

<sup>f</sup> North of Lake Diana only.



MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: Unit: 5

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay,  
Eastern Gulf Coast

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 26

Population Status and Trend

Based on hunter success rates, the mountain goat population appears stable.

Population Composition

A population composition survey was conducted on 24 August from Mount Pinta to the northwest side of Harlequin Lake. Eleven kids and 36 adults were counted in 1.2 hours (31 kids: 100 adults, 40 goats/hour). In the same area in 1984, 15 kids and 42 adults were enumerated in 1.1 hours (38 kids: 100 adults, 52 goats/hour).

Mortality

For the 2nd consecutive year, 53 registration permits were issued to goat hunters in Unit 5 (Table 1). Thirty-five permittees did not hunt, while nine hunted unsuccessfully for an average of 3.4 days. Five residents and 4 nonresidents took 5 male and 4 female goats; they averaged 3.0 days afield. Most hunters (7) used aircraft; the remainder (2) used boats. Goats were taken in September (2), October (3), November (2), and December (2). Two goats each were taken from Chaix Hills, Karr Hills, Nunatak Bench, and the east Brabazon Mountains; 1 additional goat was taken from an undetermined site in Icy Bay.

Management Summary and Recommendations

While the number of goat hunters in Unit 5 has decreased over the past 7 years, the success rate has remained high. The declining harvest of goats from the unit appears to be the result of less effort, rather than a reflection of a reduced

population. However, 1 guide who works in Subunit 5A reported seeing fewer goats in the eastern Brabazon Mountains than during past years. Attention should be paid to the male:female ratio of the harvest, which has been skewed towards females in two of the last 3 years. The male:female ratio of the harvest for the 1972-1986 period is 133:100.

Complete age-composition surveys of Subunit 5A should be conducted in 1987. The area bordering the north and east side of Nunatak and Russell Fjords is of special interest because of a pending ice dam. If the ice dam forms, the saltwater fjord will be transformed into a large freshwater lake, changing hunter access and goat distribution. Also, the U.S. Forest Service may extend Forest Highway 10 further east in the Yakutat Forelands. If the road extension occurs, protection of goat habitat and control of hunter access will need to be addressed.

No change in season or bag limit is recommended.

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Table 1. Historical mountain goat hunter effort and success in Unit 5, 1980-86.

Year	Permits issued	Permittees not hunting	Permittees hunting		Success rate (%)
			Unsuccessful	Successful	
1980	90	37	29	24	45
1981	102	49	33	20	38
1982	91	46	31	14	31
1983	89	48	18	23	56
1984	73	45	21	7	25
1985	53	26	19	8	30
1986	53	35	9	9	50
Totals	551	286	160	105	
Means	79	41	23	15	39

Table 2. Historical mountain goat harvest in Unit 5, 1972-1986.

Year	Sex			Totals
	Male	Female	Unknown	
1972	18	13	1	32
1973	10	3	0	13
1974	14	5	0	19
1975	10	3	0	13
1976	4	3	0	7
1977	4	2	0	6
1978	2	8	0	10
1979	12	6	1	19
1980 <sup>a</sup>	--	--	--	24
1981	12	8	0	20
1982	8	5	1	14
1983	8	5	1	23
1984	2	4	1	7
1985	2	6	0	8
1986	5	4	0	9
Totals	116	80	4	224
Means	8	6	1	15

<sup>a</sup> Error on hunter report form precluded determination of sex ratio.

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 6

GEOGRAPHICAL DESCRIPTION: Prince William Sound and north Gulf Coast

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

Composition counts were conducted by fixed-wing aircraft during August, September, and October in 21 of 50 count areas (Figs. 1 and 2). Assuming that observed goats represented 60-80% of the actual population, population estimates for each count area were extrapolated from the composition data. In Subunit 6A (west of Seal River and Bering Glacier) 244 goats were observed in 5 of 6 count areas; the estimated population ranged from 300-340 goats. In Subunit 6B (Ragged Mountains count area) 121 goats were observed, representing an estimated 145-170 goats. In Subunit 6D (between Rude River and Columbia Glacier) 836 goats were observed in 15 of 18 count areas; the estimated population ranged from 950-1,100 goats. Twenty-five count areas in the remainder Unit 6 were not surveyed.

Goat populations in portions of Subunits 6A and 6B appear to be increasing, but populations are declining in portions of Subunit 6D. Comparable composition counts were last conducted in 1980, 1981, and 1983 (Table 1). In Subunit 6A, west of Seal River, 1986 counts were 32% higher than those in 1980; however, count areas 6A-7 (Suckling Hills) and 6A-10 (Mount Hamilton ridge) exhibited low, declining populations. In count area 6B-1 (Ragged Mountains), the 1986 count increased 142% over the 1980 count; a 145% increase occurred in the adult segment. In Subunit 6D (between Rude River and Columbia Glacier, 6D-1 thru 6D-10) goats had declined 15% since 1980; and in the 7 subareas that could be compared, less goats were observed in 5 of them. The western portion of Subunit 6D (between Unakwik Inlet and Tiger Glacier, 6D-12 thru 6D-16) has never been counted; however, a steady decline in harvest since 1980 suggests that a population decline has occurred. The annual goat harvests from 1980 to 1986 were 19, 13, 5, 5, 7, 1, and 3, respectively.

### Population Composition

Composition counts in portions of Subunits 6A, 6B, and 6D identified 1,201 goats (957 adults and 244 kids). The percentage of kids ranged from a high of 23% in Subunit 6B to a low of 20% in Subunit 6D (Table 2).

The percentage of kids in 1986 was generally higher than the mean recruitment in Unit 6 from 1969 through 1985 (Table 3). Recruitment in Subunits 6B, 6C, and 6D was typically lower than recruitment in 6A, except for 2 years (1980 and 1986). In most years in which counts were conducted, recruitment in Subunit 6C was lower than recruitment in other areas (Table 3).

### Mortality

Five hundred fifty-three hunting permits were issued in 1986. A minimum of 120 hunters killed a goat, 192 hunters reported they were unsuccessful, 226 permittees did not hunt, and the remainder (15) did not report. Hunters experienced a 38% success rate in the fall and winter hunts. Successful hunters primarily used airplanes (53%) and boats (29%) to travel to their hunting area.

Hunters killed 75 males (63%) and 39 females (32%); 6 goats (5%) of unspecified sex were not recovered. The mean age of males was 5.9 years ( $n = 68$ , range = 1.3-16.3 years), and the mean age of females was 6.2 years ( $n = 35$ , range = 0.3-14.3 years).

Hunter success was concentrated in the months of September and October. Chronologically, goats were harvested in August (12%), September (46%), October (37%), and November-January (1%); the remainder (4%) is unknown. Because Subunits 6C and 6D were closed by emergency order at the end of October, caution should be taken when comparing data. August appeared to produce an unusually low percentage of the harvest, compared with past years. Between 1983 and 1985, 28% of the harvest occurred in August. Poor hunting weather in August 1986 was probably the cause for reduced effort and success, while weather in September and October was more favorable.

An analysis of goat harvests in Unit 6 for 1984 through 1986 indicated no difference in the percentage of females that were harvested in each month during the season (Table 4). In Units 7 and 15, Holdermann (1986) believed that goat behavior (segregation of sexes in late fall during movements to winter range) was a principal factor resulting in a higher harvest of females during October. This trend did not occur in Unit 6 because hunting effort was more widely dispersed and hunters



were more inclined to select billies rather than nannies. I believe the higher number of females killed in October is primarily related to hunting behavior rather than goat behavior. In the registration hunt in Unit 6, hunters knew beforehand when the season would close; they were not psychologically "rushed" into making a decision as to which goat they wanted. On the other hand, the registration hunts in Units 7 and 15 were closed by emergency order after a predetermined quota of goats was killed. The possibility of an impending season closure tends to pressure hunters into killing the first goat they see, and because females are generally more accessible in October than males, females are more likely to be taken. This premise should be kept in mind when registration hunts with quotas are held prior to November in areas with easy access.

#### Management Summary and Recommendations

An emergency order closing Subunits 6C and 6D was issued in October because the reported harvest met or exceeded the liberal harvest levels in 12 of 13 subareas. Most of Subunit 6D did not have population data to allow harvest-level assessment, so the 6 remaining subareas were also closed. Although the Cape Yakataga subarea (6A-2) in Subunit 6A exceeded desirable harvest levels, hunting effort in past years typically dropped off in November; and additional harvest was not expected. Acceptable harvest limits in 1986 were set at 10% of the most recent goat count or no more than half of the number of kids observed, whichever was smaller. This level of harvest is liberal by most goat harvest standards (Johnson 1983).

The history of mountain goat management in Unit 6 was reviewed during this period, and changes in management strategies that were necessary to restore goat numbers to previous levels were identified. Subpopulation ranges need to be identified (Nichols 1985), but until that information is available, small manageable subareas should be established using natural barriers such as geographical boundaries. Composition counts need to be conducted in areas that have never been counted, and surveys should be conducted more frequently in popular hunting subareas and/or subareas where numbers have declined. Appropriate harvest levels need to be identified for each subarea; levels should be conservative in subareas of declining or low populations and in subareas where populations are subject to natural predation. Upper harvest levels should probably not exceed 7% of observed goats in any subarea; in subareas where recruitment is low or the population is low or declining, appropriate upper levels might need to be as low as 3% of observed goats. Harvest levels need to be closely monitored through the season to prevent excessive harvest.

Since 1980 the majority of goat hunting in Unit 6 was by registration permit. The registration permit was designed to provide the manager with reliable and timely information concerning hunter success and hunter effort; unsuccessful hunters are required to report. Unfortunately, harvest data from the registration permits were not always used as a management tool to evaluate the effects of harvest during hunting season. Upper harvests limits were only loosely established. Only when populations experienced drastic declines (determined primarily from composition counts) were these data closely reviewed and closures enacted. In several local areas with good access, substantial harvest levels were not considered detrimental to goat populations (Reynolds 1986). Lack of intensive management was probably the reason that goat populations in easily accessible subareas declined to low numbers.

Four subareas were identified as having populations too low to support harvests. Subarea 6C-1 experienced harvest levels in 1986 at 17% of the estimated population; however, kids represented only 11% of the previous year's population. The estimated goat population in 6C-1 was 30 in 1985. Subareas 6D-7 thru 6D-9 had a combined population of approximately 80 goats in 1986. Reported harvest in 1985 approached 19% of the population. Five goats (6% of population estimate) were killed in these subareas in 1986 before the emergency closure was implemented in October. All 4 subareas have easy road access and low, declining goat numbers. Continuous closures are recommended until these subpopulations recover to a minimum of 40 goats in each subarea; the preferred population is 50 goats.

In contrast, 3 subareas in western Subunits 6A and 6B that have been closed to hunting have goat populations capable of supporting a conservative harvest and should be reopened to hunters. Subarea 6A-8 previously closed by regulation errors (J. Reynolds, pers. comm.) exhibited a high density of goats (167 goats observed/hr); the estimated population is 180. Don Miller Hills (subarea 6A-11) was closed by emergency order in 1980 because of low goat numbers: only 12 goats were observed. In 1986, 46 goats were observed in this area; 24% were kids. Ragged Mountains (subarea 6B-1) was closed in 1981 when only 50 goats were observed; 121 goats were counted in 1986, and 23% were kids. Previous popularity and susceptibility to excessive harvest in the latter 2 subareas warrant limited hunter participation.

To prevent overharvesting by hunters, upper harvest limits need to be considered for each subarea. Sustainable harvest levels cannot be determined if trend or composition counts are not available. No survey data are available for subareas

6D-11 thru 6D-16; therefore, until counts provide a basis to establish harvest levels, these subareas should be closed.

Because an emergency order was necessary to prevent excessive harvest in most subareas of Unit 6, a shorter hunting season is appropriate at this time. Also, I recommend hunt area boundaries should closely follow associated subareas identified in Figs. 1 and 2.

#### Literature Cited

- Holdermann, D. H. 1986. Units 7 and 15 mountain goat survey-inventory progress report. Pages 30-33 in B. Townsend, ed. Annual report of survey-inventory activities. Part VII. Mountain goat. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5, Job 12.0. Juneau. 39 pp.
- Johnson, R. L. 1983. Mountain goats and mountain sheep of Washington. Washington State Game Dep. Bio. Bull. No. 18. Fed. Aid Proj. W-88-R. 196 pp.
- Nichols, L. 1985. Mountain goat fidelity to given areas by season and seasonal movements. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Final Rep. Proj. W-21-1, W-21-2, W-22-1, W-22-2 and W-22-3, Job 12.5R Juneau. 72pp.
- Reynolds, J. L. 1986. Unit 6 mountain goat survey-inventory progress report. Pages 29-31 in B. Townsend, ed. Annual report of survey-inventory activities. Part V II. Mountain goat. Vol. XVI. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-4, Job 12.0 Juneau. 41 pp.

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Table 1. Six-year trend in number of goats observed during composition counts in comparable portions of subareas in Game Unit 6, 1980-1986.

Subarea	Number of adults/kids observed				% Change	
	1980	1981	1983	1986	Total goats	Adults
6A-7	23/9	No	No	9/4	-59	-61
6A-8	81/24	surveys	surveys	122/31	+46	+51
6A-10	12/7	"	"	8/2	-47	-33
6A-11	8/4	"	"	35/11	+283	+338
6A Subtotal	124/44			174/48	+32	+40
6B-1	38/12	No	No	93/28	+142	+145
6B Subtotal	38/12			93/28	+142	+145
6D-1	No	--	86-20	86/11	-8	0
6D-2	surveys	95/26	--	104/22	+4	+9
6D-4	"	167/33	--	145/44	-6	-13
6D-5	"	147/20	--	94/22	-31	-36
6D-6	"	51/6 <sup>a</sup>	--	12/4 <sup>b</sup>	-72	-76
6D-9	"	15/0 <sup>a</sup>	--	7/2 <sup>b</sup>	-40	-53
6D-10	"	30/2 <sup>b</sup>	--	35/8 <sup>a</sup>	+34	+17
6D Subtotal		591/107		483/113	-15	-18
Unit 6 Total		753/163		750/189 <sup>c</sup>	+3	0

<sup>a</sup> Partial count.

<sup>b</sup> Comparable portion to partial count.

<sup>c</sup> 262 additional goats observed in 1986 outside of comparable areas.

Table 2. Mountain goat composition counts in Unit 6, 1986.

Subunit	Adults	Kids	Total	% Kids	Goats/hr.
Subunit 6A	192	52	244	21	101
Subunit 6B	93	28	121	23	106
Subunit 6D	672	164	836	20	74
Unit 6 Totals/Avg	957	244	1,201	20	94

Table 3. Comparison by subunit of the percentage of mountain goat kids observed in 1969-85 to the 1969-85 mean and to the percentage of kids observed in 1986.

Year	<u>6A</u> % (n)	<u>6B</u> % (n)	<u>6C</u> % (n)	<u>6D</u> % (n)	Total Unit 6 % (n)
1969	-- <sup>a</sup>	18 (159)	22 (307)	--	20 (466)
1970	30 (83)	--	--	--	30 (83)
1972	--	14 (69)	--	14 (235)	14 (304)
1973	24 (172)	21 (149)	--	21 (421)	22 (742)
1974	20 (94)	--	--	19 (62)	20 (156)
1975	12 (50)	--	--	--	12 (50)
1977	21 (848)	17 (12)	10 (103)	8 (192)	18 (1,155)
1978	23 (176)	22 (55)	--	--	23 (231)
1979	--	--	19 (32)	19 (278)	19 (310)
1980	26 (168)	24 (50)	--	27 (123)	26 (341)
1981	--	--	--	16 (721)	16 (721)
1983	--	--	6 (32)	19 (329)	18 (361)
1984	25 (322)	--	--	--	25 (322)
1985	--	--	12 (145)	--	12 (145)
Mean					
1969-85	22 (1,913)	19 (494)	17 (619)	17 (2,361)	19 (5,387)
1986	21 (244)	23 (121)	--	20 (836)	20 (1,201)

<sup>a</sup> No counts for that year in subunits are indicated by a dashed line.

Table 4. Sex composition of mountain goats killed in August, September, October, and November-January in Game Unit 6, 1984-86.<sup>a</sup>

Month	Males	Females	Total	Female(%)
August	45	27	72	37.5
September	64	36	100	36.0
October	60	36	96	37.5
Nov/Dec/Jan	30	17	47	36.2
Total	199	116	315	36.8

<sup>a</sup> 1984-1986 includes the periods 1 August 1984 to 31 January 1987 during open hunting seasons.

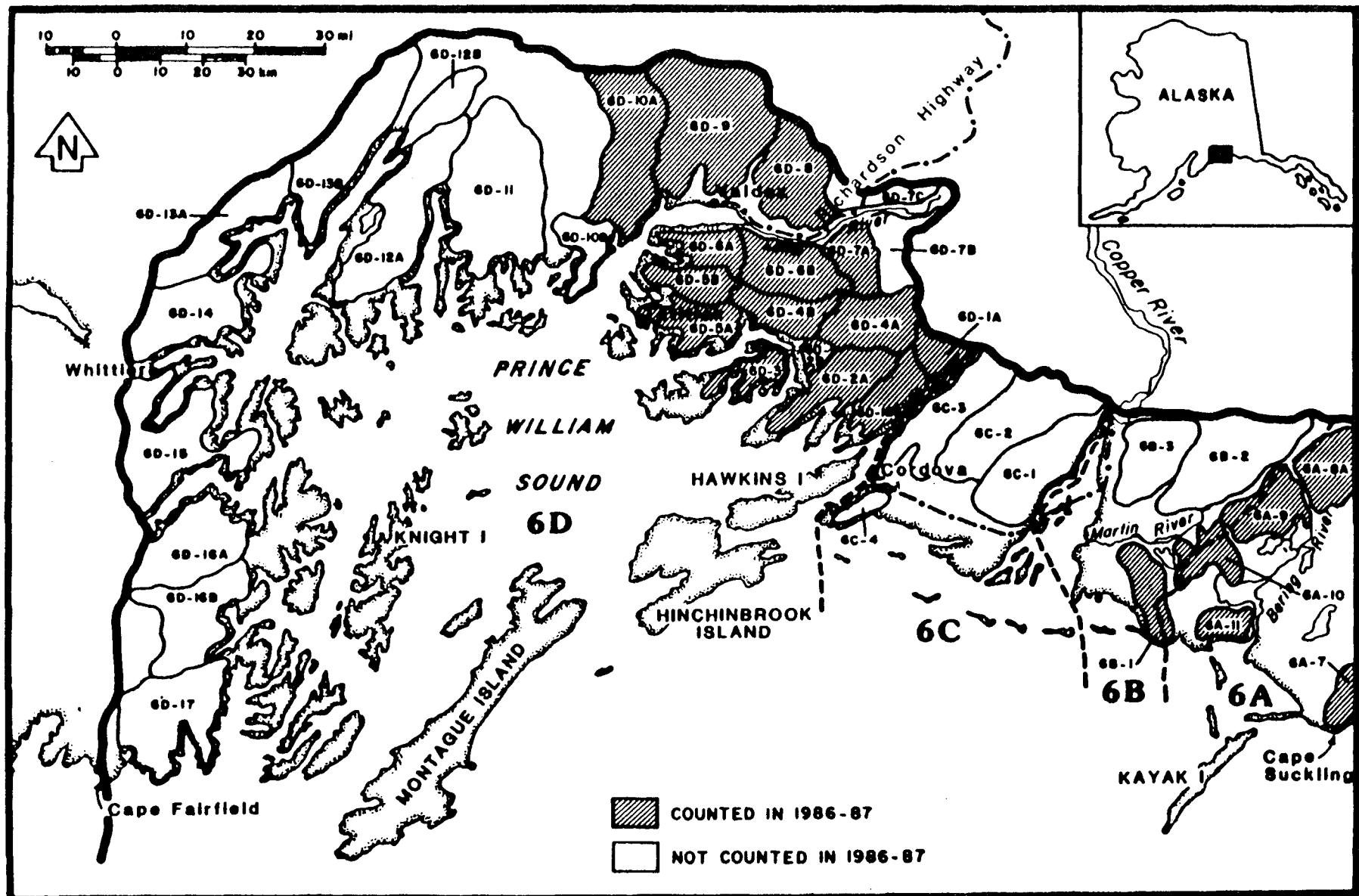


Fig. 1. Mountain goat count areas, management subareas, and subunits in western Game Management Unit 6.

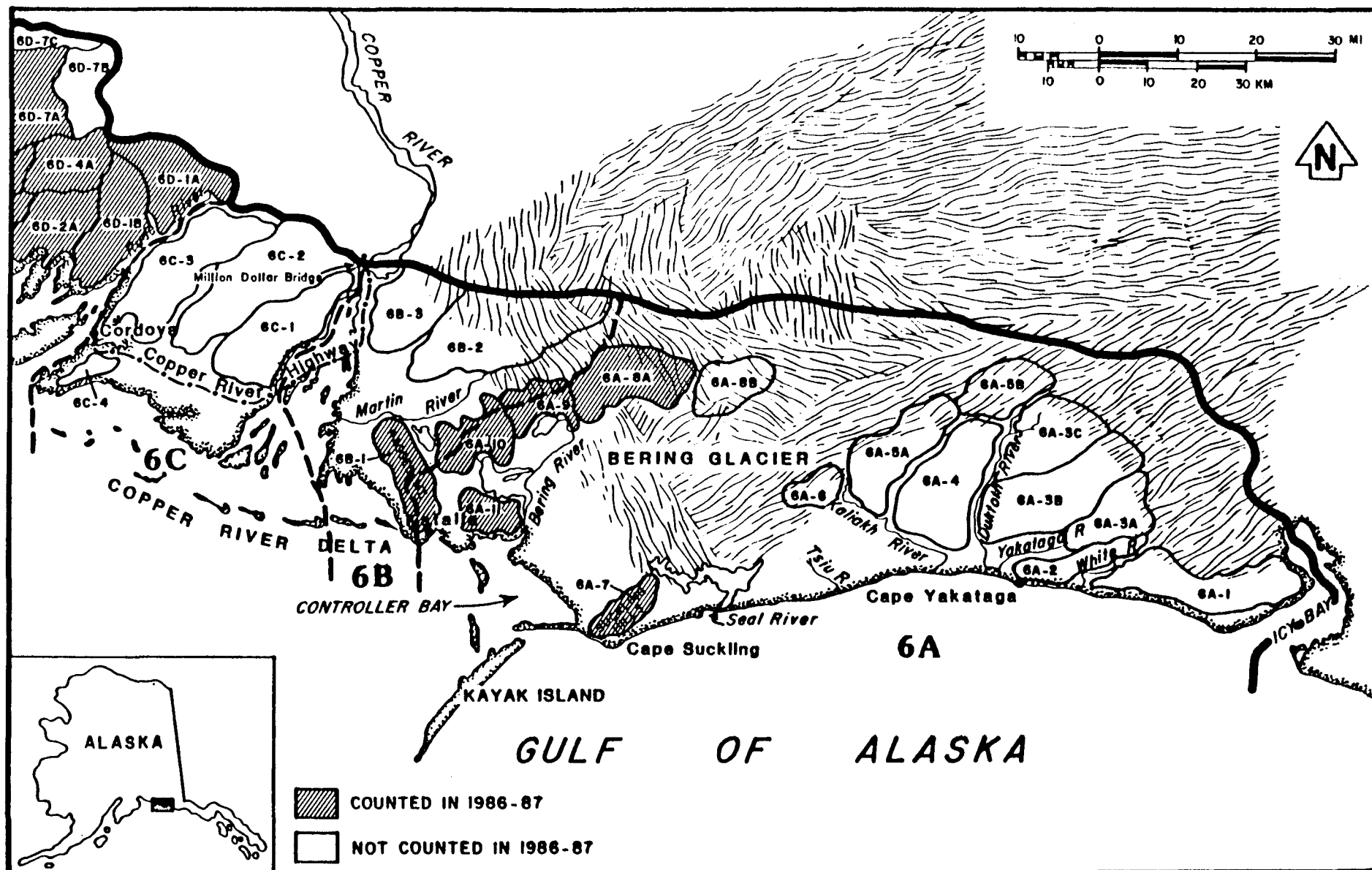


Fig. 2. Mountain goat count areas, management subareas, and subunits in eastern Game Management Unit 6.



## MOUNTAIN GOAT

### SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNITS: 7 and 15

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

PERIOD COVERED: 1 July 1986-30 June 1987

#### Season and Bag Limit

See Hunting Regulations No. 27.

#### Population Status and Trend

Mountain goats are abundant in most parts of the Kenai Mountains. Minimum population density on summer range varies from 0.5 goats/mi<sup>2</sup> along the west slope of the mountains to 2.5 goats/mi<sup>2</sup> in coastal environments (Holdermann 1986). Goat populations have stabilized over much of their range.

#### Population Composition

Fixed-wing aerial surveys were conducted in 6 count areas in 1986; however, complete coverage was accomplished in just 3 areas. Three hundred and two goats were classified, including 73 kids and 229 adults and yearlings. Kids represented 24% of the sample, and the ratio of kids to adults was 32:100.

#### Mortality

In 1986 mountain goat harvests were managed by either drawing-permit hunts (12 hunt areas) or by registration-permit hunts (13 hunt areas). The Board of Game established subsistence goat-hunting areas (hunt areas 864 and 865) for the residents of Seldovia, Port Graham, and English Bay.

Hunters reported harvesting 118 mountain goats in the Kenai Mountains (hunt areas 831-865) in 1986. Sixty hunters participated in the permit-drawing hunts (6 September-31 October), and they killed 35 goats (Table 1). Southcentral offices issued 370 registration permits (6 September-31 October); 189 (51%) of these permittees actually hunted, resulting in a harvest of 83 goats (Table 2). Included in the registration-hunt harvest were 8 mountain goats taken by subsistence hunters in hunt areas 864 and 865.

The sex composition of the annual harvest was 74 males (63%), 43 females (36%), and 1 goat of unspecified sex (1%). The percentage of females in the October harvest (48%) remained considerably higher than that for the September harvest (28%). Age was determined by examining the horn annuli of the 102 goats harvested in 1986 (Table 3). Males ranged from 1.3 to 10.3 years of age; females, from 0.3 to 9.3 years of age. Reproductively mature, prime-aged goats (i.e., 2.3-6.3 years) represented 86% ( $n = 60$ ) of the males and 75% ( $n = 24$ ) of females in the harvest. Four-year-olds were the most abundant age class for both sexes. Mean horn length of both sexes increased progressively through the 5th year (Table 3).

Harvest chronologies between drawing- and registration-permit hunts were quite different. In the drawing-permit hunt, 68% of the harvest occurred in weeks 6-9. In the registration-permit hunt there were 2 peaks: 60% of the goats were harvested in weeks 1-3, and 38% were taken in weeks 5-7. Hunters with drawing permits took 65% of the estimated allowable harvest, and hunters with registration permits took 89%.

Helicopter surveys of goats on the Dixon Glacier winter range on 10 December 1986 and 27 April 1987 provided some insight into overwinter mortality. The population decreased 16%: from 49 goats in December to 41 goats in April. The reduction in numbers of kids (31%) exceeded that of adults and yearlings (11%).

#### Management Summary and Recommendations

Hunting is an additive source of mortality in native mountain goat populations (Hebert and Turnbull 1977; Kuck 1977; Smith 1986). In Southeast Alaska, Smith (1986) found that mountain goat populations increased rapidly when adult hunting mortality was 4% or less and natural mortality was low. During the period 1980 through 1986, Kenai Peninsula goat populations appeared to increase and stabilize at relatively high densities over much of their range while being subjected to annual hunting mortality of approximately 7%. Winters were generally mild, and natural mortality of goats was believed to be low.

The Kenai Peninsula mountain goat range is subdivided into 31 count areas. Goat populations in these areas have been monitored by a rotation of aerial composition surveys, which are conducted in July and August. Because of the large number of count areas and the difficulties in completing surveys (caused by inclement weather), usually fewer than 20% of the count areas were surveyed annually and rotation lengths between successive surveys in a particular count area were highly variable. This approach has provided a general picture

of goat populations on the Kenai Peninsula, but it has not provided consistent monitoring of populations in specific areas through time.

The goat population monitoring program should develop a data base that reflects changes in sex and age composition and relative abundance over time. "Aggregate" sample areas should be established from traditional count areas for both "coastal" and "continental" environments of the Kenai Peninsula goat range. Two coastal aggregate sample areas are proposed: one centered around the Resurrection Peninsula and one in the vicinity of upper Kachemak Bay. The Resurrection Peninsula aggregate should include Bear Mountain (Count Area 847), Resurrection Peninsula (Count Area 846), and Cape Fairfield (Count Area 845); and the upper Kachemak Bay aggregate should include the drainages along the west slope of the Kenai Mountains bounded by the Fox River and Grewing Glacier (count areas 858, 859, and 860). The continental aggregate should include the drainages along the west slope of the Kenai Mountains from Skilak Glacier south to the Fox River (count areas 855, 856, and 857).

Aggregate sample areas would be given the highest priority for aerial surveys each year. To ensure continuity of historical population data, each count area within an aggregate should be treated as a separate entity and surveyed independently in the usual manner. If possible, surveys of aggregate sample areas should be completed in 1 day to minimize the biases from environmental conditions and goat movements and to minimize the chances of postponement because of inclement weather. Grouping 3 or more traditional count areas into 1 sample unit would reduce the chances of count variability from movements of goats in or out of the sampling area. By knowing the surface area of each aggregate sample area, intensive aerial counts of goats can be used to derive a "minimum" population density. Most importantly, standardized surveys of aggregate sample areas will allow tracking of mountain goat populations in specific areas over time that, in turn, will provide valuable insights into population response to various levels of hunting mortality. Goat populations in count areas outside of aggregate sample areas should be counted on an "as-needed" basis. Additionally, composition surveys to assess winter mortality is also recommended. High winter mortality of goats on the Kenai Peninsula was documented by Lyman Nichols (1985). Helicopter surveys of discreet goat populations conducted in December and in April would provide practical means of measuring winter mortality. Winter mortality surveys should be conducted annually in each of the aggregate sample areas. A helicopter is recommended for this type of survey because of the limited airspace around most winter ranges and the need to

accurately identify and count kids, yearlings, and adults by sex.

Analysis of sex ratios of goats harvested on the Kenai Peninsula has shown that nannies are more than twice as likely to be harvested in October than in August/September (Holdermann 1986). Since 1982, 63% of the nannies harvested ( $n = 133$ ) on the Kenai Peninsula were killed in October, even though October seasons accounted for less than one-third of the hunter effort. Most harvested nannies are in their prime reproductive years (Table 3). Nannies in the Kenai Mountains may be more vulnerable to hunting in October because fall movements place them closer to hunter-access points.

Reduced harvests of nannies would provide for higher recruitment into the population and help mitigate for the additive effects of hunting mortality. Mature nannies could be protected by making it illegal to kill any adult goat accompanied by a kid during the month of October. In addition, hunters should be educated to identify the sex of mountain goats in the field and encouraged not to kill adult nannies.

#### Literature Cited

- Hebert, D.M., and G.W. Turnbull. 1977. A description of southern interior and coastal mountain goat ecotypes in British Columbia. Proc. Int. Mountain Goat Symp. 1:126-146.
- Holdermann, David A. 1986. Units 7 and 15 mountain goat survey-inventory progress report. Pages 30-33 in B. Townsend, ed. Annual report of survey-inventory activities. Part VII. Mountain Goat. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wild. Rest. Prog. Rep. Proj. W-22-5. Job 12.0 Juneau. 39pp.
- Kuck, L. 1977. The impact of hunting on Idaho's Pashimeroi mountain goat herd. Proc. Int. Mountain Goat Symp. 1:114-125.
- Nichols, L. 1985. Mountain goat fidelity to given areas by season and seasonal movements. Alaska Dep. Fish and Game. Fed. Aid in Wild. Rest. Final Report. Proj. W-21-1, W-22-1, W-22-2, and W-22-3. Job 12.5R. Juneau. 72 pp.

Smith, C. A. 1986. Rates and causes of mortality in mountain goats in southeast Alaska. J. Wildl. Manage. 50:743-746.

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Table 1. Drawing-permit harvests and hunting statistics of mountain goats on the Kenai Peninsula (GMUs 7 and 15), 1986.

Permit drawing hunt numbers	Allowable harvest <sup>a</sup>	No. permits issued	No. hunters	Percent success	Harvest			
					M	F	Unk	Total
831	2	2	2	100	1	1	-	2
834	2	4	3	33	-	1	-	1
835	2	4	3	-	-	-	-	-
839	6	16	8	50	1	3	-	4
842	6	11	8	75	4	2	-	6
843	2	2	2	50	1	-	-	1
846	12	40	15	60	6	3	-	9
847	3	12	5	20	-	1	-	1
855	2	4	-	-	-	-	-	-
857	4	10	6	67	3	1	-	4
860	8	15	3	100	2	1	-	3
862	5	10	5	80	3	1	-	4
Totals	54	130	60	58	21	14	-	35

<sup>a</sup> allowable harvest = 0.5%-0.8% of known goat population.

Table 2. Registration-permit harvests and hunting statistics of mountain goats on the Kenai Peninsula (GMUs 7 and 15), 1986.

Registration hunt numbers	Allowable harvest <sup>a</sup>	No. permits issued	No. hunters	Percent success	Harvest			
					M	F	Unk	Total
833	4	18	11	36	4	-	-	4
836	5	23	13	31	3	1	-	4
835	2	4	3	-	-	-	-	-
840	8	17	5	40	2	-	-	2
844	8	65	33	21	5	2	-	7
845	14	64	35	43	6	8	1	15
852	6	17	10	60	5	1	-	6
854	5	14	9	78	5	2	-	7
858	6	33	13	62	5	3	-	8
859	7	14	9	89	6	2	-	8
861	8	32	13	38	4	1	-	5
863	10	30	14	64	4	5	-	9
864	8	24	15	33	3	2	-	5
865	5	15	6	50	1	2	-	3
Totals	96	370	189	45	53	29	1	83

<sup>a</sup> allowable harvest = 0.5%-0.8% of known goat population.

Table 3. Age distribution and horn lengths of mountain goats harvested on the Kenai Peninsula, 1986.

Sex	Age	Birth year	M	Mean horn length	Range of horn length
Male	0.3	1986	0		
	1.3	1985	3	6.81	6.50 - 7.25
	2.3	1984	14	8.33	7.25 - 9.25
	3.3	1983	8	8.64	7.25 - 9.25
	4.3	1982	22	9.12	7.50 - 9.94
	5.3	1981	12	9.37	8.38 - 10.00
	6.3	1980	4	9.23	8.94 - 9.38
	7.3	1979	2		
	8.3	1978	3	9.40	8.31 10.13
	9.3	1977	1		
	10.3+		1		
Subtotal			70		
Females	0.3	1986	1		
	1.3	1985	2		
	2.3	1984	4	7.86	7.25 - 8.63
	3.3	1983	5	8.25	7.25 - 9.00
	4.3	1982	8	9.30	8.75 - 9.56
	5.3	1981	5	9.70	8.50 - 10.56
	6.3	1980	2	9.13	9.00 - 9.25
	7.3	1979	2	8.69	8.13 - 9.25
	8.3	1978	2	8.88	8.63 - 9.13
	9.3	1977	1		
	10.3+		0		
Subtotal			32		
Grand Total			102		



MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 8

GEOGRAPHICAL DESCRIPTION: Kodiak and adjacent islands

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The mountain goat population on northeastern Kodiak Island appears to have decreased since the last reporting period. Summer aerial surveys of northern and eastern Kodiak Island yielded 213 goats in 6.5 hours. Winter, spring, and summer aerial surveys of Kizhuyak and northwest Ugak Bay drainages were again conducted to assess impacts of the Terror Lake Hydroelectric Project on goats in that area (Smith and Van Daele 1987). Each of these surveys indicated a decrease of at least 21% in the number of goats from 1985 to 1986. The goat population in these drainages appears to have steadily increased from 1974 to 1982. Between 1982 and 1985, the estimated population stabilized at around 210 goats. In 1986, 164 goats were observed (Fig. 1.). No comparable data are available for other drainages on the island.

Population Composition

A 20 kids:100 adults ratio (17% kids) was recorded during an aerial survey in June 1986 (post-kidding). During spring surveys in 1982-86, the ratio of kids:adults in the Terror Lake study area averaged 29:100 (range = 20:100 to 38:100). In this 5-year period, productivity in the study area peaked in 1983 at 38 kids:100 adults and then steadily declined to 20 kids:100 adults in 1986.

The northwestern Ugak Bay drainage had the greatest number of kids throughout the 5-year period ( $\bar{x}$  = 30.2; range = 13-48;  $n$  = 151), followed by Kizhuyak Bay drainage ( $\bar{x}$  = 6.0; range = 3-11;  $n$  = 30). Most of the decline in overall kid production was a result of poor productivity in the northwest Ugak drainages. Similar declines were not noted in Kizhuyak and Terror-Uganik Bay drainages.

## Mortality

The second-highest reported goat harvest (40 goats) on Kodiak Island occurred in 1986, including 23 males (58%) and 17 females (42%). Fifty-six of 100 permittees reported hunting, and hunter success was 71% of those permittees who hunted. The mean age of 23 males was 3.9 years (range = 1.3-10.3 years). The mean age of 16 females was 4.1 years (range = 1.3-8.3 years).

## Management Summary and Recommendations

A return to drawing permits for goat hunting on Kodiak Island resulted in increased selectivity by hunters and a more uniform distribution of hunting effort. High harvests have been recorded since 1984 (Fig. 2). Higher harvests were largely due to expansion of the legal hunt area (Hunt 876) and the liberalization of permit requirements in 1984 and 1985 (Smith 1986).

Although Terror Lake has been used for access since the inception of goat hunting in 1968, the hydroelectric project has enhanced floatplane access by extending Terror Lake 3 km and by creating a new reservoir in the alpine pass between Kizhuyak and Terror Rivers. Road access for hunters between Kizhuyak Bay and Terror Lake was also created, although vehicular traffic has been prohibited. Goat hunters made frequent use of these project features during the 1984-86 seasons.

Declining goat productivity and the apparent stabilization and decline in the number of goats in northwest Ugak-Kizhuyak Bay drainages occurred simultaneously with construction (1982-83) and operation (1984-86) of the Terror Lake hydroelectric project. However, no direct mortality attributable to project activities or features was noted, and goats were frequently observed in close proximity to the project throughout construction. Parturition was also noted near project activities. Most of the decline in both productivity and density was in northwest Ugak drainages, an area not directly affected by project activities. These drainages were the site of the original goat introductions in 1952 and 1953 (Burris and McKnight 1973), and they have the highest estimated goat densities (1 goat per 3.43 km<sup>2</sup>). The population stabilization and subsequent decline in 1982-86 may be attributable to declining range quality, but no data are available to support this hypothesis.

If the apparent decline in the northwest Ugak-Kizhuyak Bay drainages has actually occurred, it may be due to a deterioration of range quality, increased harvest, or a combination of both factors. No changes in harvest strategy are recommended

at this time; however, the population trend should be monitored closely.

Literature Cited

Burris, O. E., and D. E. McKnight. 1973. Game Transplants in Alaska. Game Technical Bulletin No. 4. Fed. Aid Wildl. Res. Proj. W-17-R. Alaska Dept. Fish and Game Juneau. 57pp.

Smith, R. B. 1986. Unit 8 mountain goat survey-inventory report. Pages 34-35 in B. Townsend, ed. Annual report of survey-inventory activities. Part VII. Mountain Goats. Volume XVII. Alaska Dep. Fish and Game. Fed. Aid Wildl. Res. Proj. W-22-5, Job 12.0. Juneau. 39pp.

Smith, R. B., and L. J. Van Daele. 1987. Terror Lake Hydroelectric Project: Final Report on Mountain Goat Studies. Alaska Dept. of Fish and Game. In Press.

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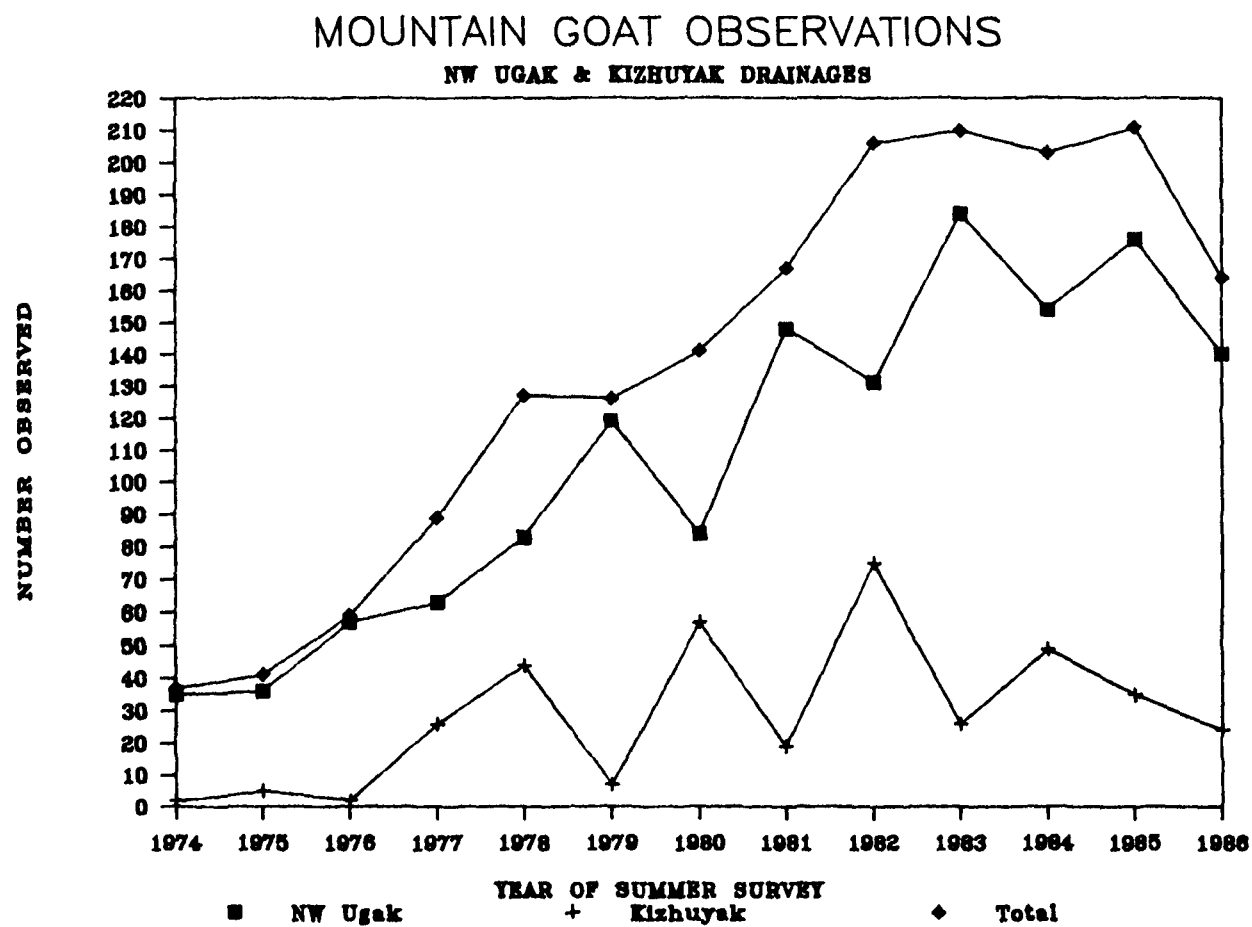


Figure 1. Mountain goats observed during summer composition aerial surveys of the northwestern Ugak and Kizhuyak Bay drainages, Kodiak Island, Alaska, 1974-86. (Note: Systematic aerial surveys were not conducted in 1975 and 1979.)

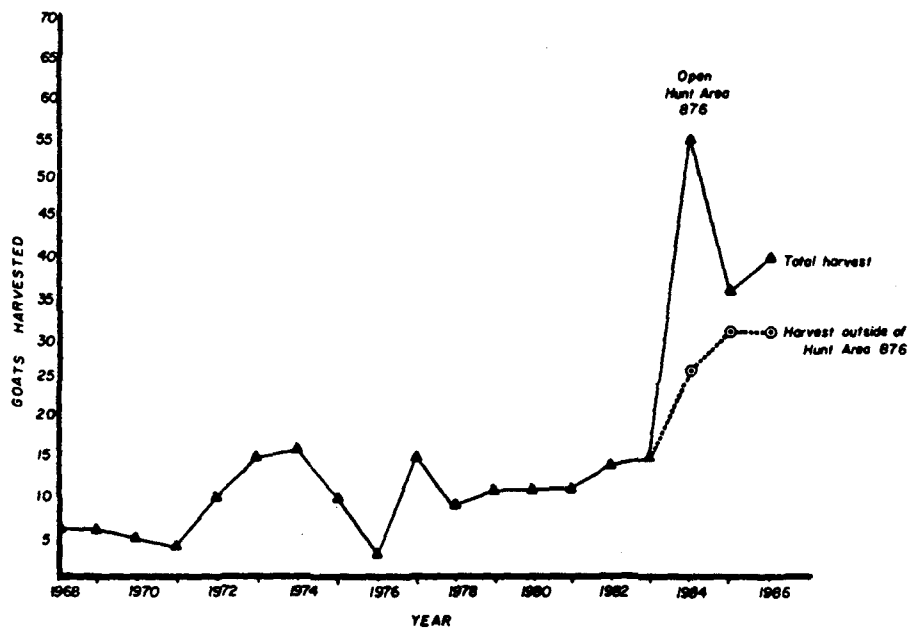


Figure 2. Mountain goats harvested in Game Management Unit 8, Kodiak Island, Alaska, 1968-86.

Table 1. The distribution of permits and harvest by permit area in Unit 8.

Hunt area	No. permits	No. goats harvested
871	20	7
872	15	8
873	20	8
874	20	8
876	25	9

MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations No. 27.

Population Status and Trend

The 27 June aerial survey of the MacColl Ridge occurred under poor conditions and resulted in only 34 mountain goats being observed; this was 46% lower than the 1985 survey of 63 goats. Trend-count results prior to 1986 suggest that the mountain goat population was slowly increasing.

Population Composition

Twenty-seven adults and 7 kids were observed during the 1986 trend count of MacColl Ridge. The 26:100 ratio of kids:adults was similar to ratios observed in 1985 and 1986: 24:100 and 27:100, respectively.

Mortality

In 1986 hunters killed 30 mountain goats (25 males and 5 females) throughout Unit 11. In the 6 years of registration-permit hunting, the harvest has averaged 12 goats per year. This year's harvest was the largest reported kill in 13 years. The hunting season was closed by emergency order on 31 October because of the high reported harvest. During the 1986 season, 50 of the 97 hunters issued permits reported hunting; their success rate was 60%. In comparison, during the past 6 years (1980-85), an average of 32 permittees who hunted had a success rate of 37%. Six successful permittees were local residents, nine were nonlocal Alaska residents, and the remainder (15) were nonresidents.

Successful hunters averaged 3.4 days hunting, compared with 4.8 days for unsuccessful hunters. Aircraft was the most popular method of transportation; 86% (26) of the successful hunters reported flying into their hunting area. Seven percent (2) of the successful hunters used highway vehicles,

and 7% used riverboats. During the period when sheep season was also open (1-20 September), 77% (23 goats) of the harvest was taken.

#### Management Summary and Recommendations

Mountain goats are difficult to count using standard aerial-survey techniques with fixed-wing aircraft. Yearly fluctuations in count data often reflect changes in mountain goat distribution and survey conditions rather than actual changes in population status. At least a portion of the decline in the number of mountain goats counted in the 1986 survey was attributed to poor count conditions; however, budget limitations did not permit a recount.

Hunting pressure and harvest on mountain goats in Unit 11 increased in 1986. Part of this increase was attributed to hunters seeking a mixed-bag hunt. Mountain goat habitat in the Wrangell Mountains also contains Dall sheep, providing hunters with a unique opportunity to simultaneously hunt 2 species. The current harvest of 30 mountain goats represents an overall harvest rate of approximately 8%, based on a 1984 population estimate of 392 mountain goats north of the Chitina River.

Although harvest did not exceed sustained yield in Unit 11, overharvesting at popular access points was possible. The harvest of 19 goats from MacColl Ridge to Bernard Glacier is probably not sustainable. Surveys should be conducted in 1987 to obtain an updated population estimate. No more than 10% of the observed goats there should be taken. Until additional data are available and harvest rates are determined for specific areas, no changes in season or bag limits are recommended.

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MOUNTAIN GOAT  
SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13 and 14

GEOGRAPHICAL DESCRIPTION: Talkeetna Mountains and  
northwestern Chugach Mountains

PERIOD COVERED: 1 July 1986-30 June 1987

Season and Bag Limit

See Hunting Regulations 27.

Population Status and Trend

Aerial surveys were conducted throughout most known goat ranges within the Talkeetna and northwestern Chugach Mountains: 515 goats were observed in Subunit 14C, 63 in Subunit 14A south of the Matanuska River, 5 in Subunit 14A north of the Matanuska River, 24 in Subunit 14B, and 134 in Subunit 13D. These figures represent the most extensive survey of the report area ever conducted in a single year. Numbers of goats observed within Subunits 14A, 14C, and 13D were the highest on record.

Population Composition

Composition of 515 goats observed in Subunit 14C was 385 (75%) adults and 130 (25%) kids. In Subunit 14A, 68 goats included 50 (74%) adults and 18 (26%) kids, and in Subunit 14B, 24 goats included 19 (79%) adults and 5 (21%) kids.

The 134 goats observed in Subunit 13D included 109 (81%) adults and 25 (19%) kids. The age composition for the entire report area (76% adults and 24% kids) was nearly identical to the 1984-85 mean age composition (75% adults and 25% kids).

Mortality

All goat hunting within the report area was by registration permit only. Permit reports from 154 hunters indicated that 49 goats (32% success rate), 31 of which were males, were killed during the hunting season. Forty-five of these goats, including 27 males and 18 females, were killed in the northwestern Chugach Mountains in Subunit 14C. One of 2 hunters reported that they hunted successfully in Subunit 14B. Three

goats were reported taken in the Chugach Mountains portion of Subunit 14A. Subunit 13D was closed to goat hunting.

The ages of 36 goats were estimated to the nearest whole year by counting horn annuli. The mean age of 23 males was 5.0 years (range 1-14), and the mean age of 13 females was 5.5 years (range 2-12).

#### Management Summary and Recommendations

Composition surveys within the Talkeetna and northwestern Chugach Mountains during 1986 were the most extensive on record. Seven hundred forty-one goats were observed throughout the entire report area; the majority of these (70%) inhabited Subunit 14C. Within Subunit 14A and 14B, numbers of goat are adequate to support the existing harvest. A slight overharvest occurred in Subunit 14C, requiring the season to be closed by emergency order. To bring about a 25% reduction in the harvest, the season in this subunit should be shortened by 6 weeks. Numbers of goats within Subunit 13D are adequate to initiate a limited drawing-permit hunt.

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